

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application. The following listing provides the amended claims with deleted material crossed out and new material underlined to show the changes made.

Claims 1-9 (Canceled)

10. (Currently Amended) A method for maintaining a trajectory of a tracked first instrument toward a target site in a human patient~~[[,]]~~ as the tracked first instrument is moved in space toward the target site in the patient, the method comprising:

- (a) using an image capture second instrument to construct an image of the target site that is defined by reference to an image coordinate ~~image-coordinate~~ system;
- (b) correlating the image coordinate system with an instrument coordinate system to place ~~the target site~~ a target site coordinate in the instrument coordinate system;
- (c) determining whether the target site has moved off the tracked first instrument's trajectory towards the target site;
- (d) after determining that the target site has moved off the tracked first instrument's trajectory towards the target site, computing a correction to the orientation of the tracked first instrument to re-orient the ~~first~~ tracked first instrument towards the target site; and
- (e) using the computed correction to correct the orientation of the tracked first instrument to maintain the tracked first instrument's defined trajectory towards the target site even as the tracked first instrument is moved in space.

11. (Previously Presented) The method of claim 10, wherein the movement of the target site is initiated by the patient.

12. (Previously Presented) The method of claim 10, wherein the movement of the target site is only initiated by the patient.

13. (Currently Amended) The method of claim 10, wherein the tracked first instrument applies a constant pressure upon the tissue surface of the patient's body while maintaining the trajectory toward the target site.

14. (Currently Amended) A computer-readable medium storing a computer program which when executed by at least one processor maintains a trajectory of a tracked first instrument toward a target site in a human patient[[,]] as the tracked first instrument is moved in space, the computer program comprising sets of instructions for:

(a) using an image capture second instrument to construct an image of the target site that is defined by reference to an image coordinate ~~image-coordinate~~ system;

(b) correlating the image coordinate system with an instrument coordinate system to place ~~the target site~~ a target site coordinate in the instrument coordinate system;

(c) determining whether the target site has moved off the tracked first instrument's trajectory towards the target site;

(d) after determining that the target site has moved off the tracked first instrument's trajectory towards the target site, computing a correction to the orientation of the tracked first instrument to re-orient the tracked first instrument towards the target site; and

(e) using the computed correction to correct the orientation of the tracked first instrument to maintain the tracked first instrument's defined trajectory towards the target site even as the tracked first instrument is moved in space.

15. (Previously Presented) The computer-readable medium of claim 14, wherein the movement of the target site is initiated by the patient.

16. (Previously Presented) The computer-readable medium of claim 14, wherein the movement of the target site is only initiated by the patient.

17. (Currently Amended) The computer-readable medium of claim 14, wherein the tracked first instrument applies a constant pressure upon the tissue surface of the patient's body while maintaining the trajectory toward the target site.

18. (Currently Amended) A device for maintaining a trajectory between a tip of a tracked first instrument and a target site in a patient's body, the device comprising:

- (a) an articulated mechanical arm having or accommodating a ~~distal-end~~ tracked first instrument having a tip that has or accommodates a force contact sensor;
- (b) an actuator operatively connected to the mechanical arm for adjusting the orientation of the mechanical arm, so as to maintain the trajectory between the tip of the tracked first instrument and the target site in the patient's body ~~in the direction of the patient target site~~;
- (c) a tracking mechanism for tracking the orientation of the tracked first instrument in an instrument coordinate system; and
- (d) a processor operatively connected to the actuator and tracking mechanism for:
 - (i) ~~[[d1]]~~ using an image capture second instrument to construct an image of the target site that is defined by reference to the image coordinate ~~image-coordinate~~ system;
 - (ii) ~~[[d2]]~~ correlating the image coordinate system with an instrument coordinate system to place ~~the target site~~ a target site coordinate in the instrument coordinate system;
 - (iii) ~~[[d3]]~~ determining whether the target site has moved off the tracked first instrument's trajectory towards the target site;
 - (iv) ~~[[d4]]~~ after determining that the target site has moved off the tracked first instrument's trajectory towards the target site, computing a correction to the orientation of the tracked first instrument to re-orient the tracked first instrument towards the target site; and

(v) [(d5)] using the computed correction to correct the orientation of the tracked first instrument to maintain the tracked first instrument's defined trajectory toward the target site even as the tracked first instrument is moved in space outside or inside the body.

19. (Currently Amended) The device of claim 18, wherein the tracked first instrument applies a constant pressure upon the tissue surface of the patient's body while maintaining the trajectory toward the target site.

20. (Previously Presented) The device of claim 18, wherein the movement of the target site is initiated by the patient.

21. (Previously Presented) The device of claim 18, wherein the movement of the target site is only initiated by the patient.

22. (New) The method of claim 10, wherein correcting the orientation of the tracked first instrument comprises directing the surgical instrument sideways of the target site.

23. (New) The method of claim 10, wherein the tracked first instrument has a first orientation before the target site moves off the tracked first instrument's trajectory, wherein the tracked first instrument has a second orientation after the correction of the orientation of the tracked first instrument.

24. (New) The method of claim 10, wherein correlating the image coordinate system with the instrument coordinate system comprises correlating in real time the image coordinate system with the instrument coordinate system.

25. (New) The computer readable medium of claim 14, wherein correlating the image coordinate system with the instrument coordinate system comprises correlating in real time the image coordinate system with the instrument coordinate system.

26. (New) The device of claim 18, wherein correlating the image coordinate system with the instrument coordinate system comprises correlating in real time the image coordinate system with the instrument coordinate system.

27. (New) The device of claim 19, wherein the force contact sensor is for providing feedback to allow the tracked first instrument to apply the constant pressure upon the tissue surface of the patient's body.

28. (New) A device for maintaining a trajectory between a tip of a tracked first instrument and a target site in a patient's body, the device comprising:

- (a) an articulated mechanical arm for directing a tracked first instrument so as to maintain the trajectory between the tip of the tracked first instrument and the target site in the patient's body;

- (b) a tracking mechanism for tracking the orientation of the tracked first instrument in an instrument coordinate system; and

- (c) a processor, operatively connected to the mechanical arm and the tracking mechanism, for:

- (i) using an image capture second instrument to construct an image of the target site that is defined by reference to the image coordinate system;

- (ii) correlating the image coordinate system with an instrument coordinate system to place the target site coordinate in the instrument coordinate system; and

- (iii) after the target site has moved off the tracked first instrument's trajectory towards the target site, computing a correction to the orientation of the tracked first instrument to re-orient the tracked first instrument towards the target site.

29. (New) The device of claim 28, wherein correlating the image coordinate system with the instrument coordinate system comprises correlating in real time the image coordinate system with the instrument coordinate system.